

## IN THE CLAIMS

Cancel claims 1-17 and add the following new claims:

18. (New) A combined earth-star sensor system for three-axis attitude determination of a satellite in space, said combined earth-star sensor system (1) comprising separate apertures with different directions of observation of earth and stars and common image pickup devices (4) for the earth observation and the star observation, and means for variable control of exposure time of earth and star observations depending on brightness of the earth and the stars being observed.

19. (New) The sensor system according to claim 18, comprising a common optical arrangement (2) for earth observation and star observation, and a deflection mirror (3) for reflection of laterally entering light from the earth, to the common optical arrangement (2).

20. (New) The sensor system according to claim 19, comprising an optical arrangement (9) for star observation, an optical arrangement (10) for earth observation and a semitranslucent beam splitter (8) between said apertures and the optical arrangements for deviating laterally entering light from the earth and transmitting light from the observed star, to the image pickup devices (4).

21. (New) The sensor system according to claim 20, wherein light from the star travels longitudinally to the optical arrangement for star observation.

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22. (New) The sensor system according to claim 18, wherein the aperture for the light from the earth is considerably smaller than the aperture for the light from the star.

23. (New) The sensor system according to claim 19, wherein the aperture for the light from the earth is considerably smaller than the aperture for the light from the star.

24. (New) The sensor system according to claim 20, wherein the aperture for the light from the earth is considerably smaller than the aperture for the light from the star.

25. (New) The method according to claim 24, comprising effecting model-based tracking of the rim of the earth.

26. (New) The method according to claim 24, comprising filtering a long-wave fraction of the radiation used for determining the rim of the earth.

27. (New) The method according to claim 25, comprising filtering a long-wave fraction of the radiation used for determining the rim of the earth

28. (New) The method according to claim 24, wherein the rim of the earth is determined by fitting earth models.

29. (New) The method according to claim 25, wherein the rim of the earth is determined by fitting earth models.

30. (New) The method according to claim 26, wherein the rim of the earth is determined by fitting earth models.

31. (New) A method for simultaneous orbit determination and attitude determination of a space vehicle, comprising:

simultaneously forming images of a star and the rim of the earth in one focal plane of a sensor system;

determining attitude of the star in said focal plane;

determining the rim of the earth by image processing;

determining rates of rotation of the sensor system from movement of the star image in the focal plane; and

calculating at least one of orbit and altitude of a space vehicle carrying the sensor system, wherein

exposure or integration time of the sensor system is alternately adapted to a difference in brightness of the light from the star and the earth.

32. (New) The method according to claim 31, wherein an evaluation

system of the sensor system operates by including a star catalog, disregarding areas in the image of the rim of the earth of star images superimposed on the earth image thus eliminating disturbing influences concerning accuracy of determining the rim of the earth in the image.

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33. (New) The method according to claim 32, comprising effecting model-based tracking of the rim of the earth.

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34. (New) The method according to claim 31, comprising filtering a long-wave fraction of the radiation used for determining the rim of the earth.

35. (New) The method according to claim 31, wherein the rim of the earth is determined by fitting earth models.

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### REMARKS

It is requested that the above amendatory action be taken prior to examiner of this application on its merits in order to expedite such examination..

Respectfully submitted,



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